CLAIMS

We claim:

1. A system for receiving and delivering into a base the radial loads imposed on a crane, wherein the crane has a center post operably connected to the base, the center post has a generally cylindrical outer bearing surface, and the crane rotates in at least a partial circle around a rotational axis of the center post, the system comprising:

a plurality of rollers arranged in a linked sequence along the outer bearing surface of the center post, each roller having an axis of rotation that is generally parallel to the rotational axis of the center post;

an anchor for anchoring a first roller at one end of the linked sequence and an anchor anchoring a second roller at the other end of the linked sequence; and

a link connecting each roller between the first and the second rollers to its adjacent rollers to form a flexible chain of said rollers,

wherein the linked rollers are in rolling contact with the outer bearing surface.

2. The system of claim 1, wherein the link comprises pivoting links and fixed links, wherein each roller between the first and second rollers is connected by a pivoting link to one of its adjacent rollers and by a fixed link to the other of its adjacent rollers.

3. The system of claim 1, further comprising a back roller including a rotational axis generally parallel to the rotational axis of the center post and a roller surface in rolling contact with the outer bearing surface, wherein the back roller is secured to a superstructure of the crane and positioned along the outer bearing surface in a location not encompassed by the flexible chain of rollers.

4. The system of claim 1, further comprising a containing pad secured to the crane center post and/or a superstructure of the crane and adapted to prevent the displacement of the flexible chain of rollers in at least one vertical direction.

5. The system of claim 1, further comprising a flange supported off of a superstructure of the crane and adapted to prevent the displacement of the flexible chain of rollers in at least one vertical direction.

6. The system of claim 1, wherein the flexible chain of rollers encompasses at least approximately 120 degrees of the cylindrical outer bearing surface of the crane center post.

7. The system of claim 1, wherein the flexible chain of rollers encompasses at least approximately 180 degrees of the cylindrical outer bearing surface of the crane center post.

8. The system of claim 1, wherein the flexible chain of rollers encompasses at least approximately 270 degrees of the cylindrical outer bearing surface of the crane center post.

9. The system of claim 1, wherein the outer bearing surface comprises a rail and the rollers are flanged to engage the rail.

10. The system of claim 1, wherein the rollers have a double inclined face, the outer bearing surface comprises a rail with a V profile, and the double inclined face of the rollers matingly interfaces with the V profile of the rail.

11. The system of claim 1, wherein each roller has a face, at least a portion of which is arcuate, the outer bearing surface comprises a profile, at least a portion of which is arcuate, and the arcuate portion of the roller faces matingly interface with the arcuate profile of the rail.

12. A method for receiving and delivering into a base the radial loads imposed on a crane, wherein the crane has a center post operably connected to the base, the center post has a generally cylindrical outer bearing surface, and the crane rotates in at least a partial circle around a rotational axis of the center post, the method comprising:

providing a plurality of rollers in a linked sequence along the outer bearing surface of the center post, each roller having an axis of rotation that is generally parallel to the rotational axis of the center post;

providing anchors for anchoring a first roller at one end of the linked sequence and anchoring a second roller at the other end of the linked sequence;

providing each roller between the first and the second rollers with a link to its adjacent rollers to form a flexible chain of said rollers; and

tensioning the linked sequence to draw each roller into rolling contact with the outer bearing surface.

13. The method of claim 12 wherein the link to the adjacent rollers comprises pivoting links and fixed links, wherein each roller between the first and second rollers is connected by a pivoting link to one of its adjacent rollers and by a fixed link to the other of its adjacent rollers.

14. The method of claim 12, further comprising providing a back roller including a rotational axis generally parallel to the rotational axis of the center post and a roller surface in rolling contact with the outer bearing surface, wherein the back roller is secured to a superstructure of the crane and positioned along the outer bearing surface in a location not encompassed by the flexible chain of rollers.

15. The method of claim 12, further comprising preventing the displacement of the flexible chain of rollers in at least one vertical direction.

16. The method of claim 12, further comprising encompassing at least approximately 120 degrees of the cylindrical outer bearing surface of the crane center post with the flexible chain of rollers.

17. The method of claim 12, further comprising encompassing at least approximately 180 degrees of the cylindrical outer bearing surface of the crane center post with the flexible chain of rollers.

18. The method of claim 12, further comprising encompassing at least approximately 270 degrees of the cylindrical outer bearing surface of the crane center post with the flexible chain of rollers.

19. A bearing system comprising:

a bearing surface forming at least a partial arc about a first axis; and

a roller chain encompassing at least a segment of the bearing surface and comprising:

a first roller, a second roller, and a third roller, each roller including a rotational axis generally parallel to the first axis and a roller surface in rolling contact with the bearing surface, wherein the rollers are radially offset from each other along the bearing surface;

a first member interlinking the first and second rollers and maintaining an offset distance between the first and second rollers; and

a second member interlinking the second and third rollers and maintaining an offset distance between the second and third rollers.

20. The bearing system of claim 19, wherein the arc about the first axis is a generally cylindrical outer surface of a crane center post.

21. The bearing system of claim 20, wherein the roller chain further includes a first end and a second end, said ends being operably coupled to a crane superstructure that supports a boom.

22. The bearing system of claim 21, further comprising a back roller including a rotational axis generally parallel to the first axis and a roller surface in rolling contact with the bearing surface, wherein the back roller is operably coupled to the crane superstructure and positioned along the bearing surface in a location not encompassed by the roller chain.

23. The bearing system of claim 21, wherein the crane superstructure includes a first anchor adapted to operably couple the first end of the roller chain to the crane superstructure and a second anchor adapted to operably couple the second end of the roller chain to the crane superstructure.

24. The bearing system of claim 23, wherein the first and second members are link plates and the first and second anchors each operably couple to the roller chain with an extended link plate.

25. The bearing system of claim 21, wherein the crane superstructure includes means for anchoring the first end and the second end of the roller chain to the crane superstructure.

26. The bearing system of claim 21, further comprising a containment pad secured to the crane center post and/or the crane superstructure and adapted to prevent the displacement of the roller chain in at least one vertical direction.

27. The bearing system of claim 21, further comprising a flange supported by the crane superstructure and adapted to prevent the displacement of the roller chain in at least one vertical direction.

28. The bearing system of claim 20, wherein the roller chain encompasses at least approximately 120 degrees of the cylindrical outer surface of the crane center post.

29. The bearing system of claim 20, wherein the roller chain encompasses at least approximately 180 degrees of the cylindrical outer surface of the crane center post.

30. The bearing system of claim 20, wherein the roller chain encompasses at least approximately 270 degrees of the cylindrical outer surface of the crane center post.

31. The bearing system of claim 19, wherein the radial offset between the first and second rollers is between approximately two degrees and approximately 20 degrees.

32. The bearing system of claim 19, wherein the radial offset between the first and second rollers is between approximately five degrees and approximately 15 degrees.

33. The bearing system of claim 19, wherein the radial offset between the first and second rollers is approximately 10 degrees.

34. The bearing system of claim 19, wherein the first member is non-pivoting relative to the rotational axes of the first and second rollers, and the second member is pivotal relative to the rotational axes of the second and third rollers.

35. The bearing system of claim 19, wherein the first member is pivotal relative to the rotational axes of the first and second rollers, and the second member is pivotal relative to the rotational axes of the second and third rollers.

36. The bearing system of claim 19, wherein the outer bearing surface is a rail and at least one roller is flanged to engage the rail.

37. The bearing system of claim 19, wherein at least one roller has a double inclined face, the outer bearing surface is a rail with a V profile, and the double inclined face of the at least one roller matingly interfaces with the V profile of the rail.

38. The bearing system of claim 19, wherein each roller has a face, at least a portion of which is arcuate, the outer bearing surface comprises a rail with a profile, at least a portion of which is arcuate, and the arcuate portion of the roller faces matingly interface with the arcuate profile of the rail.

39. The bearing system of claim 19, further comprising means for preventing the displacement of the roller chain in at least one vertical direction.

40. The bearing system of claim 19, further comprising a containment pad adapted to prevent the displacement of the roller chain in at least one vertical direction.

41. The bearing system of claim 19, further comprising a flange adapted to prevent the displacement of the roller chain in at least one vertical direction.

42. A method of delivering radial loads from a first structure into a bearing surface of a second structure, wherein the bearing surface forms at least a partial arc about a first axis and the first structure is rotationally displaceable about the first axis, the method comprising:

routing a roller chain along at least a portion of the bearing surface, said roller chain including a first end, a second end, and a plurality of flexibly interlinked rollers between the first and second ends, each roller including an axis of rotation that is generally parallel to the first axis;

operably connecting the first end of the roller chain to a first anchor point on the first structure;

operably connecting the second end of the roller chain to a second anchor point on the first structure; and

causing each roller to rollably contact the bearing surface.

43. The method of claim 42, further comprising causing the roller chain to radially displace along the bearing surface as the first structure rotates about the first axis.

44. The method of claim 43, wherein the rollers rollably travel along the bearing surface as the roller chain radially displaces along the bearing surface.

45. The method of claim 42, wherein the first and second anchor points are radially offset from each other about the first axis by at least approximately 120 degrees.

46. The method of claim 42, wherein the first and second points are radially offset from each other about the first axis by at least approximately 180 degrees.

47. The method of claim 42, wherein the first and second points are radially offset from each other about the first axis by at least approximately 270 degrees.

48. The method of claim 42, further comprising tensioning the roller chain to equalize substantially the radial loads applied by the interlinked rollers to the bearing surface.